

**APPENDIX A**

**PAPER TRANSPARENCIES**

A-1. These paper transparencies are to be replicated as plastic transparencies for use with an overhead projection system.

A-2. Each transparency is numbered at the bottom right. That number is identified in the body of each lesson outline.

## Objective

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**AFTER THE COMPLETION OF THIS LESSON, THE STUDENT WILL BE FAMILIAR WITH THE CHARACTERISTICS OF THE 50,000-POUND RTCH. THE STUDENT WILL ALSO BE ABLE TO IDENTIFY THE MAJOR COMPONENTS AND CONTROLS AND INSTRUMENTS OF THE 50,000-POUND RTCH.**

Transparency 4-1



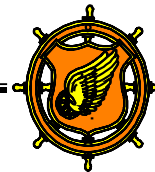
# EQUIPMENT PURPOSE

Transparency 4-2



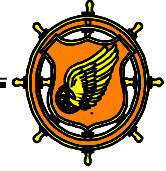
**HANDLES INTERNATIONAL  
STANDARDS ORGANIZATION (ISO)  
DESIGNATION 1A OR 1C CARGO  
CONTAINERS OR SEALAND  
CONTAINERS.**

Transparency 4-3



# **HANDLES AND STACKS CONTAINERS (TWO HIGH).**

Transparency 4-4



# **LOADS AND UNLOADS FLATBED TRAILERS AND RAILCARS.**

Transparency 4-5



# **MAKES OVER-THE-SHORE LANDINGS.**

Transparency 4-6



# **CAPABILITIES AND FEATURES**

Transparency 4-7





**OPERATES OVER ROUGH  
TERRAIN INCLUDING  
BEACHES, SNOW, MUD, AND  
CROSS COUNTRY.**

Transparency 4-8



**FORDS UP TO 60 INCHES OR  
5 FEET OF SALT WATER.**

Transparency 4-9



**COMES WITH A 20-FT  
TOPHANDLER AND MAY  
ALSO HAVE A 35-FT OR  
40-FT TOPHANDLER.**

Transparency 4-10



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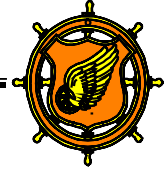
**RAISES, LOWERS, TILTS  
FORWARD OR BACKWARDS,  
SIDE SHIFTS, OR SIDE TILTS  
A CONTAINER LOAD.**

Transparency 4-11



**LIFTS A CONTAINER  
FROM 12 INCHES (30 CM)  
BELOW GROUND LEVEL  
TO 118 INCHES (300 CM)  
ABOVE GROUND LEVEL  
(MEASURED FROM  
GROUND TO BOTTOM OF  
CONTAINER).**

Transparency 4-12



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**ARTICULATES FOR EASY  
LOAD HANDLING (BENDS IN  
THE CENTER).**

Transparency 4-13



**RTCH CAN LIFT UP TO  
50,000 POUNDS.**

Transparency 4-14



**THE RTCH IS BUILT BY THE  
CATERPILLAR TRACTOR CO.  
THE ARMY PURCHASED THE  
RTCH IN 1984 FOR \$159,138  
PER RTCH.**





# INTRODUCTION TO COMPONENTS

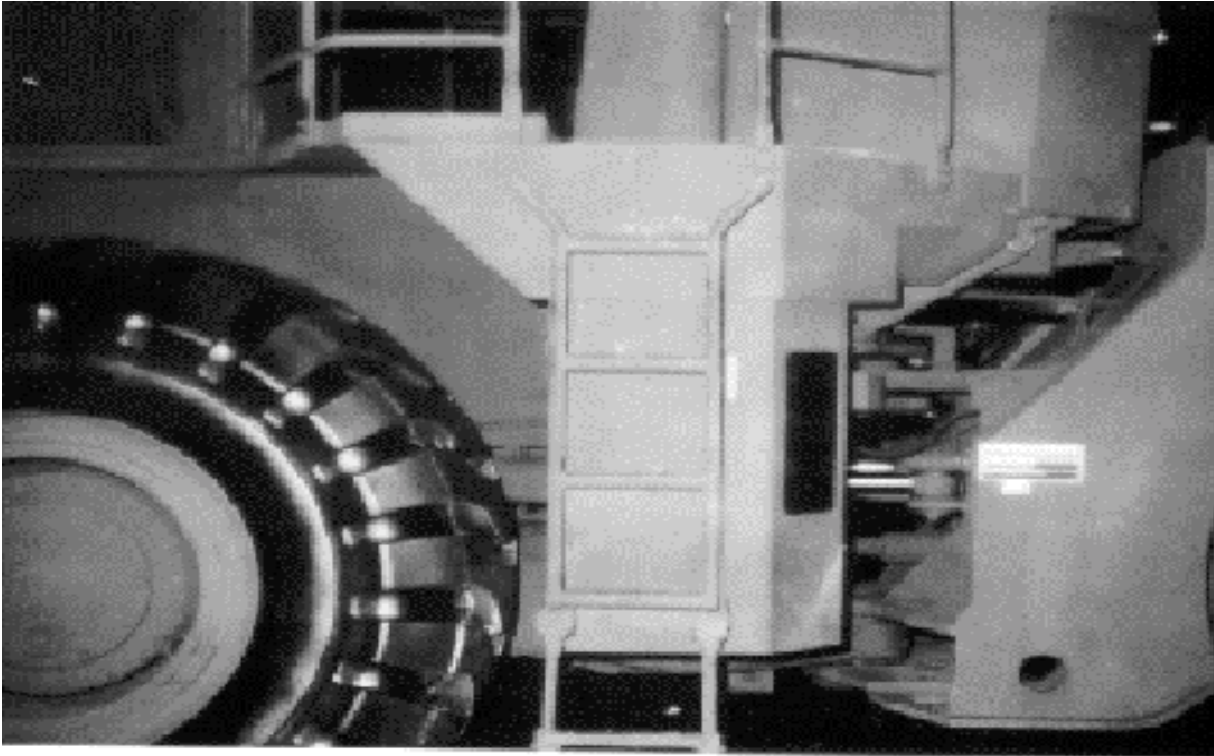
Transparency 4-16



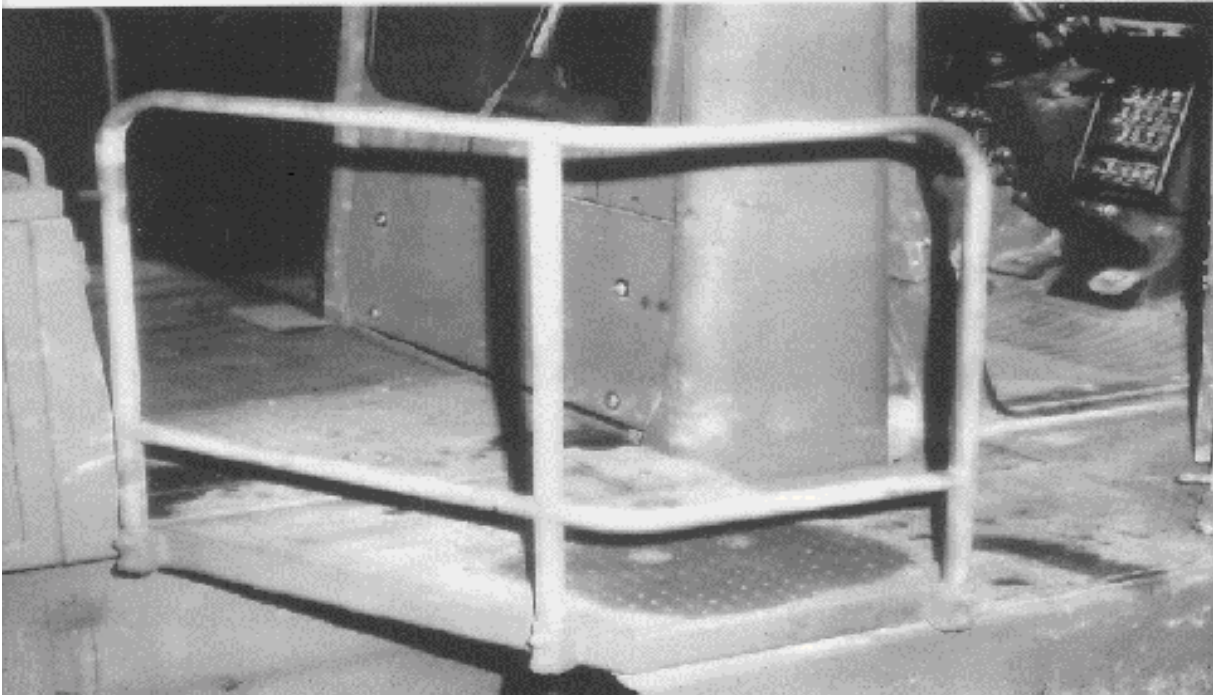
Transparency 4-17



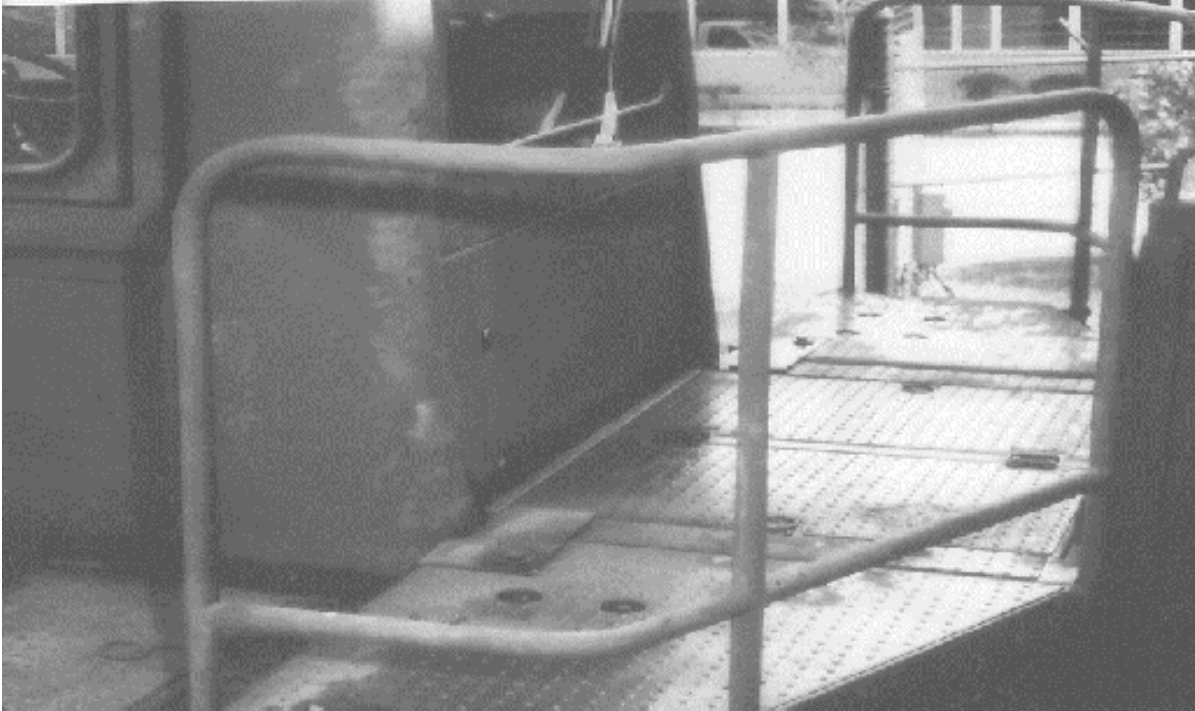
**Transparency 4-18**



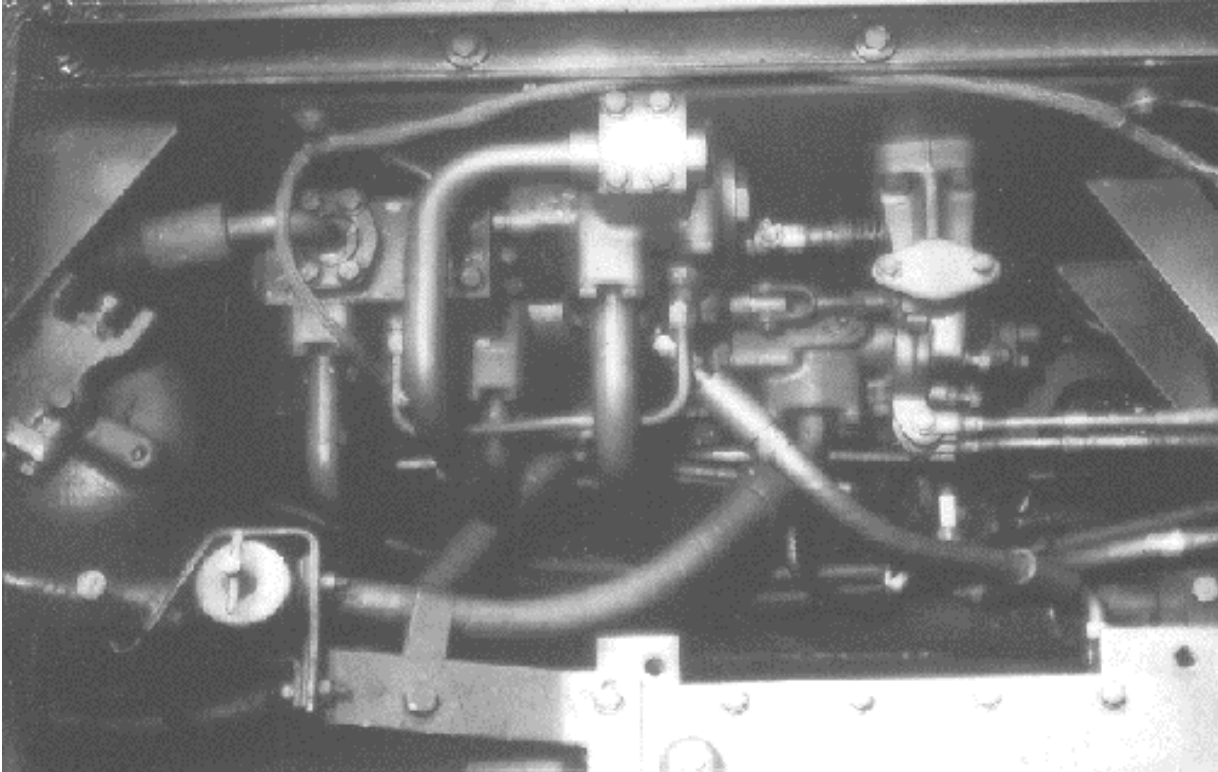
Transparency 4-19



Transparency 4-20

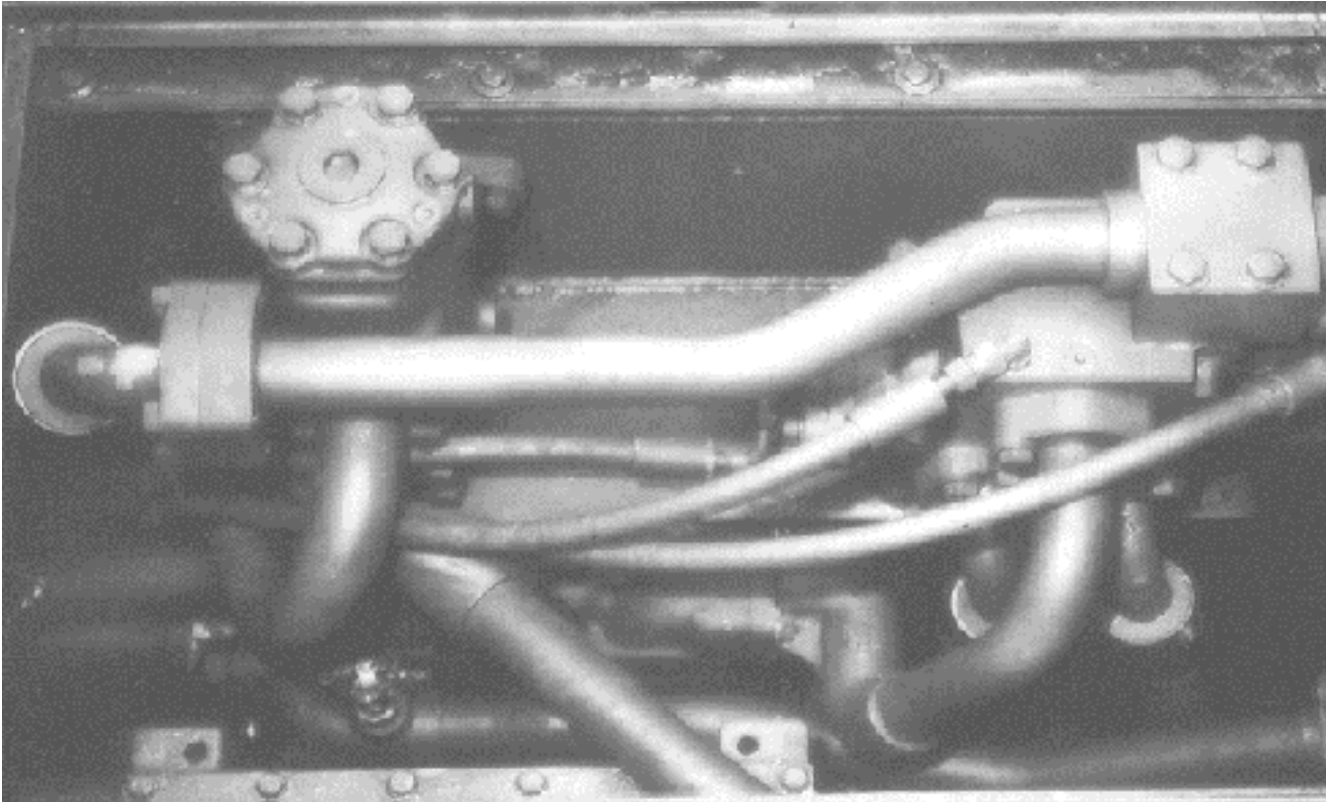


Transparency 4-21



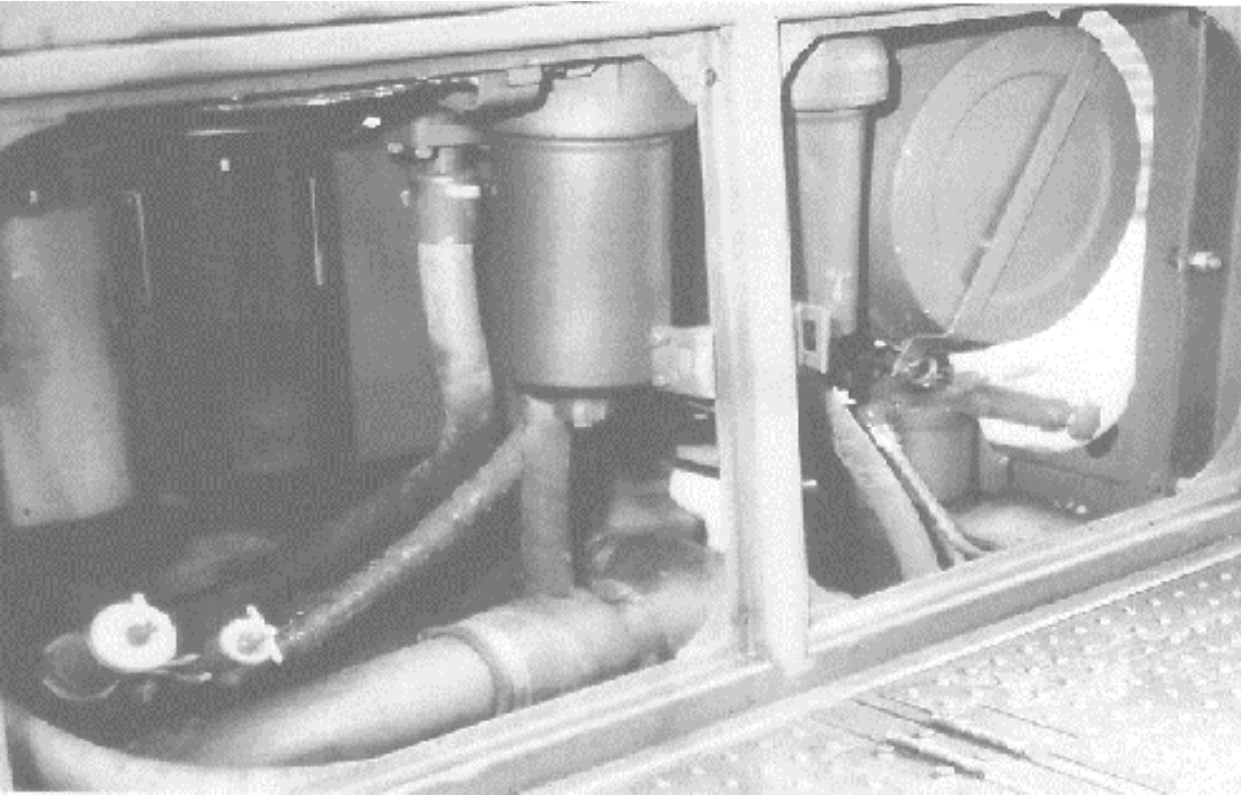
Transparency 4-22



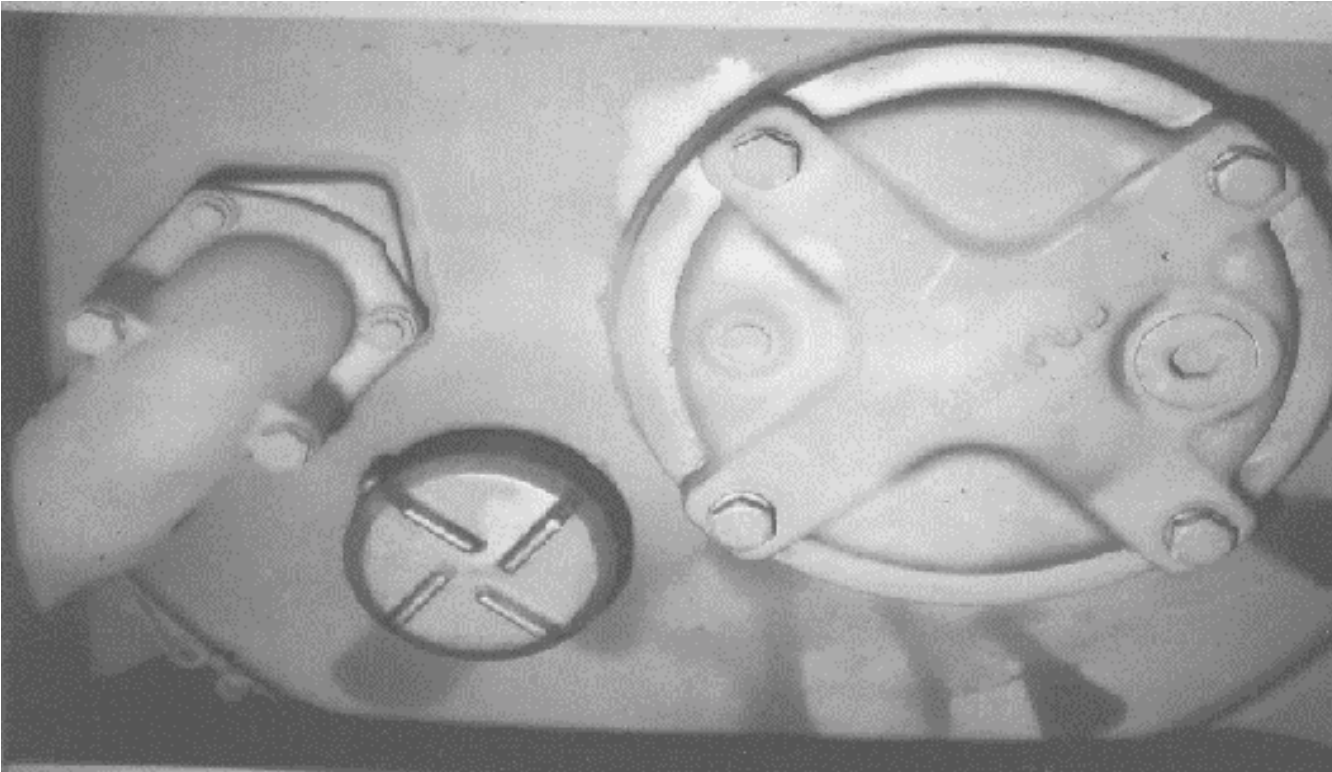


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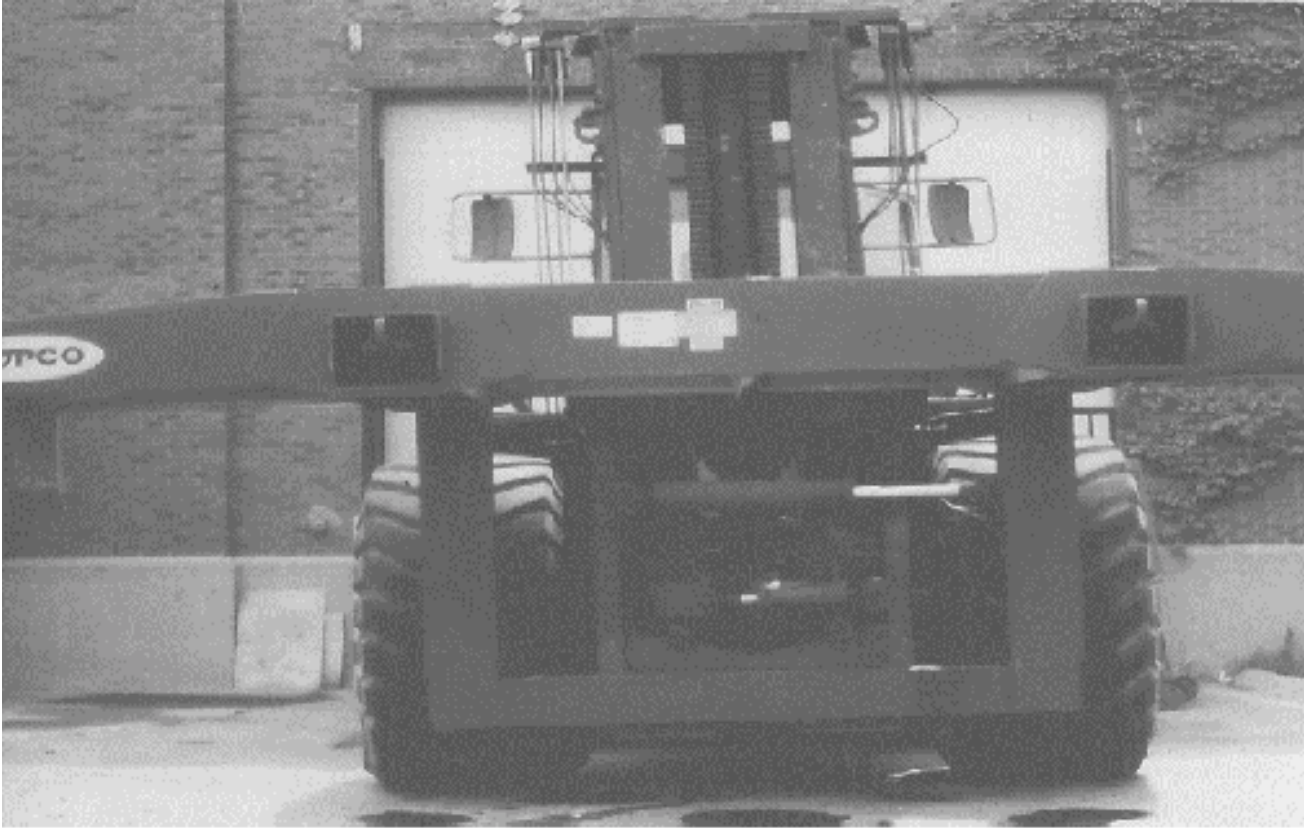




Transparency 4-24



Transparency 4-25



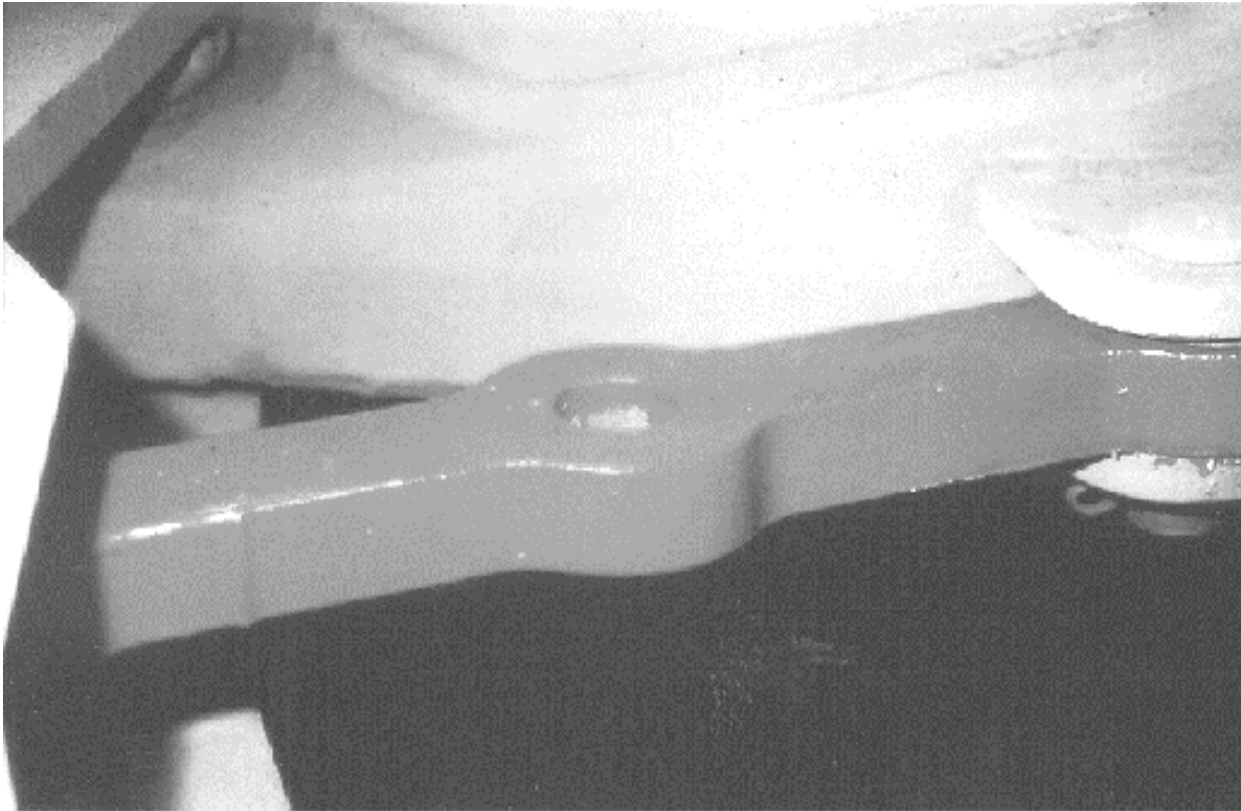
Transparency 4-26



Transparency 4-27

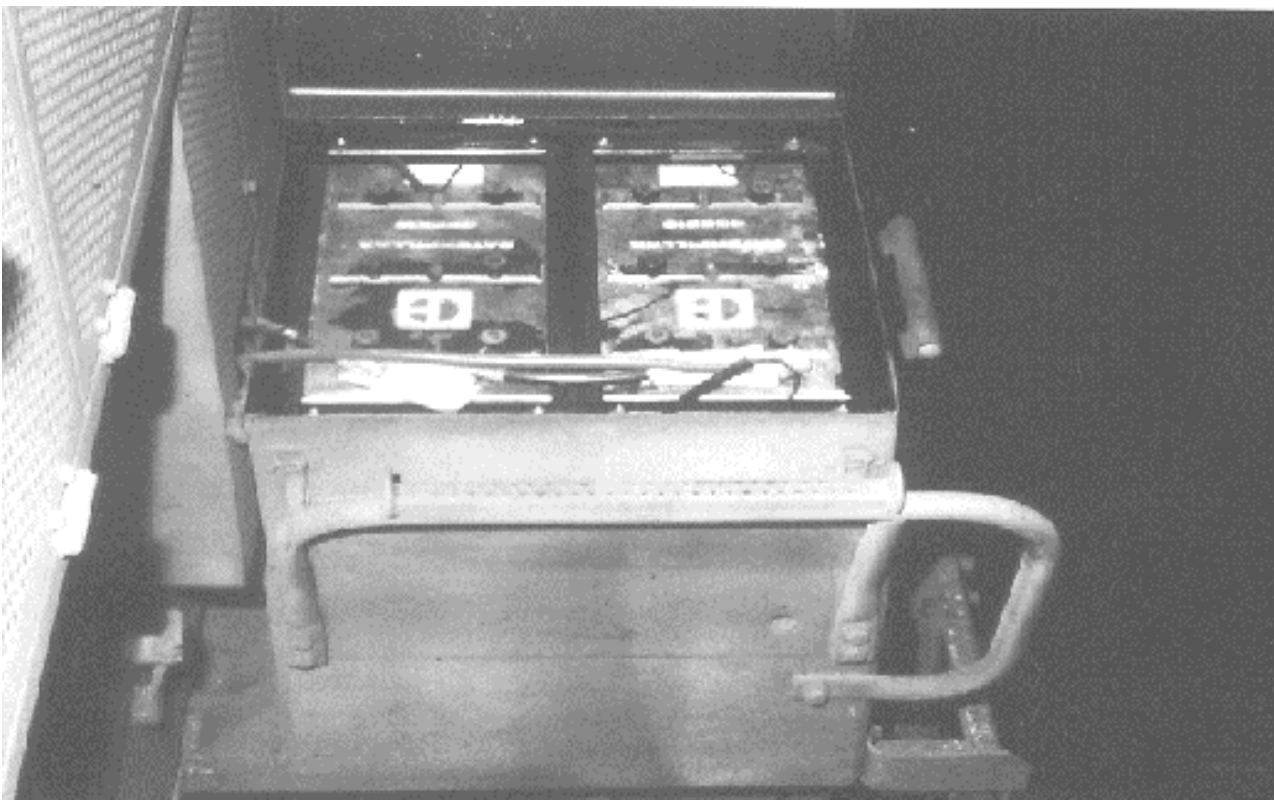


Transparency 4-28

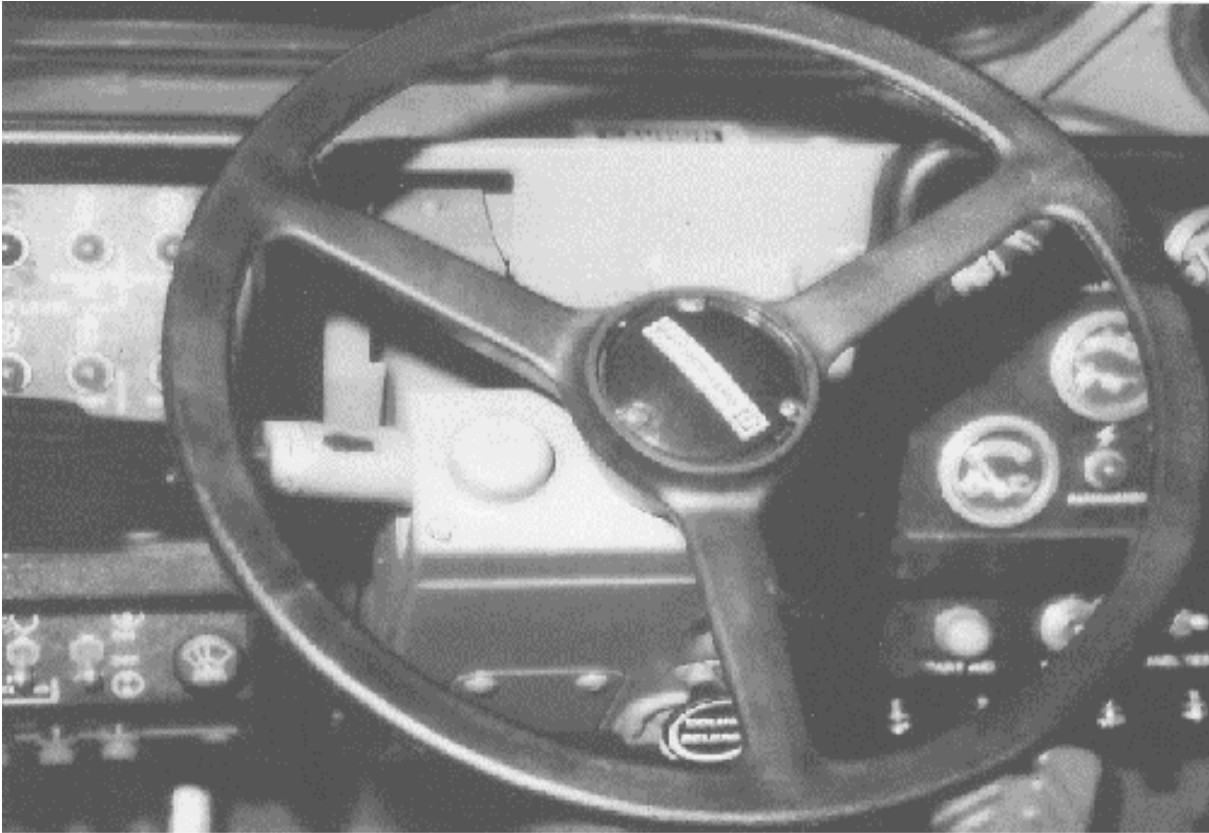


Transparency 4-29



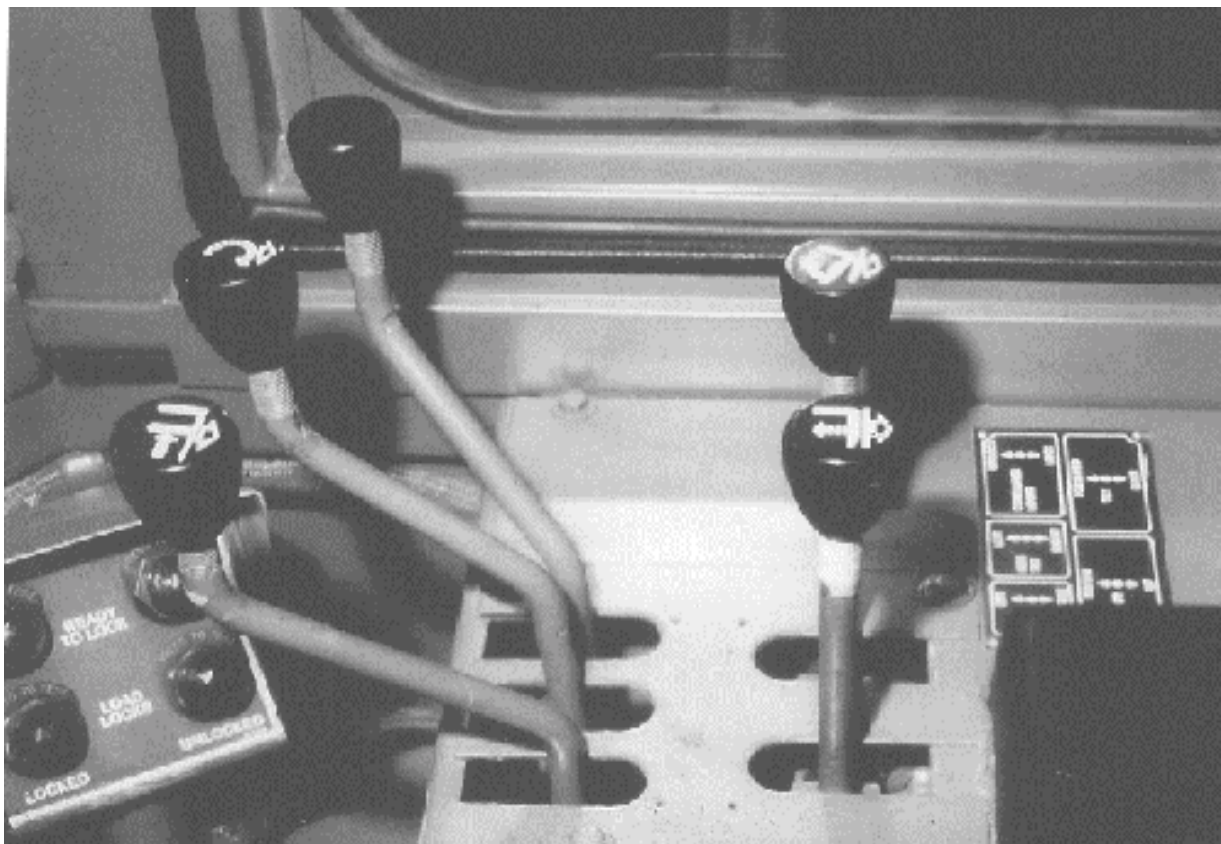


Transparency 4-30



Transparency 4-31





Transparency 4-32



Transparency 4-33



- **Radiator.**
  - **Provides engine coolant.**
  - **Holds 28 gallons.**
  
- **Upper engine access panels.**
  - **To panels on each side.**
  - **Allows engine access for maintenance.**

Transparency 4-34



- **Hood.**
  - **Two piece unit.**
  - **Removable for engine maintenance.**
  
- **Operator's cab.**
  - **Rollover protective structure.**
  - **Will withstand one rollover.**



- **Tilt cylinders.**
  - **Two cylinders for tilting.**
  - **Tilts mast forward or backward.**
  
- **Mast.**
  - **Moves to position the container.**
  - **Will lift container 12 inches below ground level.**
  - **Lift to 118 inches high from bottom of container.**
  - **Will stack containers two high.**

Transparency 4-36



- **Forks.**
  - **Mounts and secures tophandlers.**
  - **Two types of forks.**
    - **Tophandler forks.**
    - **Inverted forks.**
- **Wheels, axles, and final drive.**
  - **Steers and propels vehicle.**
  - **One tire and rim weighs 3,000 pounds and is 6 feet tall.**
  - **Fording height is 5 feet.**



- **Steering cylinder.**
  - **One on each side.**
  - **Acts as power steering.**
  
- **Hitch. Articulates for easy steering.**

Transparency 4-38



- **Hydraulic tank.**
  - **Holds 78 gallons of hydraulic oil.**
  - **Located on right side.**
  
- **Fuel tank.**
  - **Holds 165 gallons of fuel.**
  - **Located on left side.**
  - **Normally 10 hours of operation.**





- **Lower engine access panels. One on each side.**
- **Battery boxes.**
  - **One on each side.**
  - **One box holds two 24-volt batteries.**

Transparency 4-40



- **Counterweights.**
  - **Provides stability for handling loads.**
  - **Has seven counterweights total.**
- **Towing pintle is for towing vehicles.**



- **Lift cylinder raises and lowers mast.**
- **Side shift cylinder.**
  - **Shifts forks and tophandler left and right.**
  - **Helps in aligning or stacking container.**

Transparency 4-42



- **Side tilt cylinder rotates forks and tophandler for loading and stacking.**
  
- **Container lock cylinders.**
  - **Rotates locks to secure tophandler to container.**
  - **One on 20-foot tophandler.**
  - **Two on 35-foot and 40-foot tophandler.**



- **Handles ISO (International Standards Organization) designation 1A or 1C cargo containers or sealand containers.**
- **Twenty-foot tophandler.**
  - **Is 230 inches long (from lock to lock).**
  - **Weight is 3,800 pounds.**
  - **Width is 95 1/2 inches without guide plates.**

Transparency 4-44



- **Thirty-five foot tophandler.**
  - **Is 34 feet, 4 inches long (from lock to lock).**
  - **Weight is 9,120 pounds.**
  - **Width is 92 3/4 inches without guide plates.**
  
- **Forty-foot tophandler.**
  - **Is 39 feet, 3 7/8 inches (from lock to lock).**
  - **Weight is 9,930 pounds.**
  - **Width is 92 3/4 inches without guide plates.**



- **Operational weight.**
  - **Without tophandler - 103,230 pounds.**
  - **With 20-foot tophandler - 107,030 pounds.**
  - **With 35-foot tophandler - 112,350 pounds.**
  - **With 40-foot tophandler - 113,160 pounds.**
- **Maximum speed without load.**
  - **Forward is 18.5 mph.**
  - **Reverse is 19.4 mph.**

Transparency 4-46



# **CONTROLS FOR THE 50,000-POUND RTCH**

Transparency 4-47





Transmission Range Selector

Column Release Knob

Column Lock

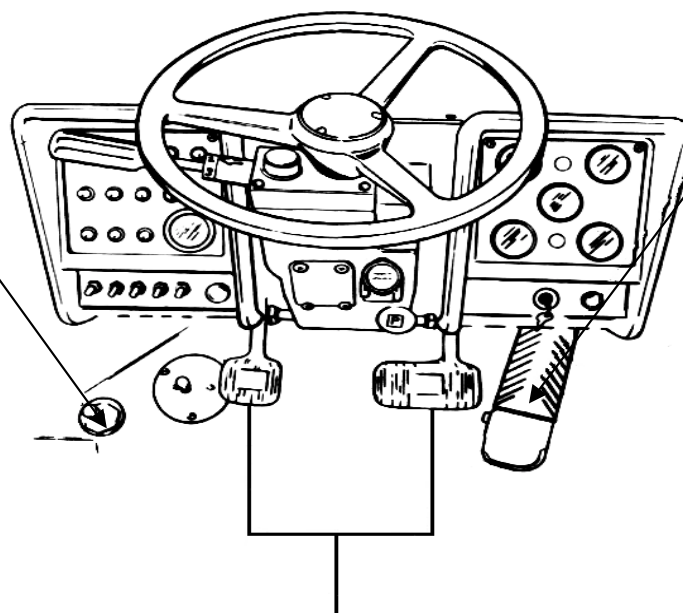
Parking Brake Control Knob

Transparency 4-48



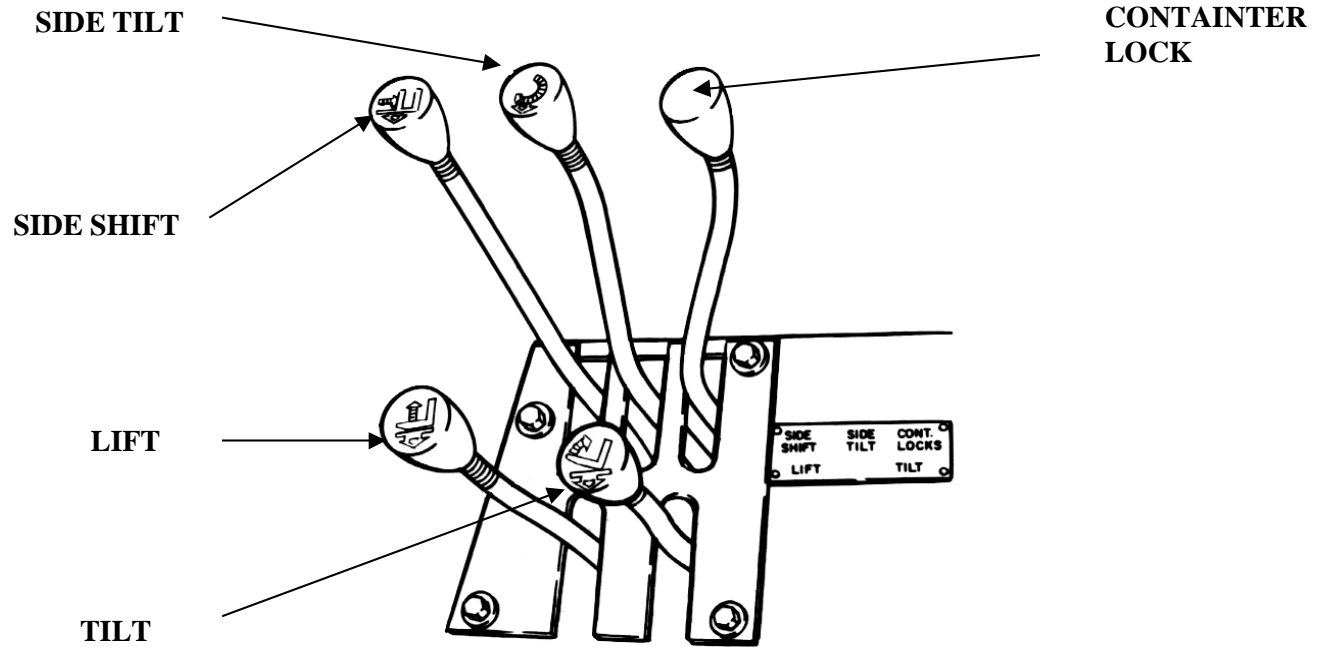
Horn Switch

Accelerator



LEFT AND RIGHT  
BRAKE PEDALS

Transparency 4-49



Transparency 4-50



Heater Temperature  
Control

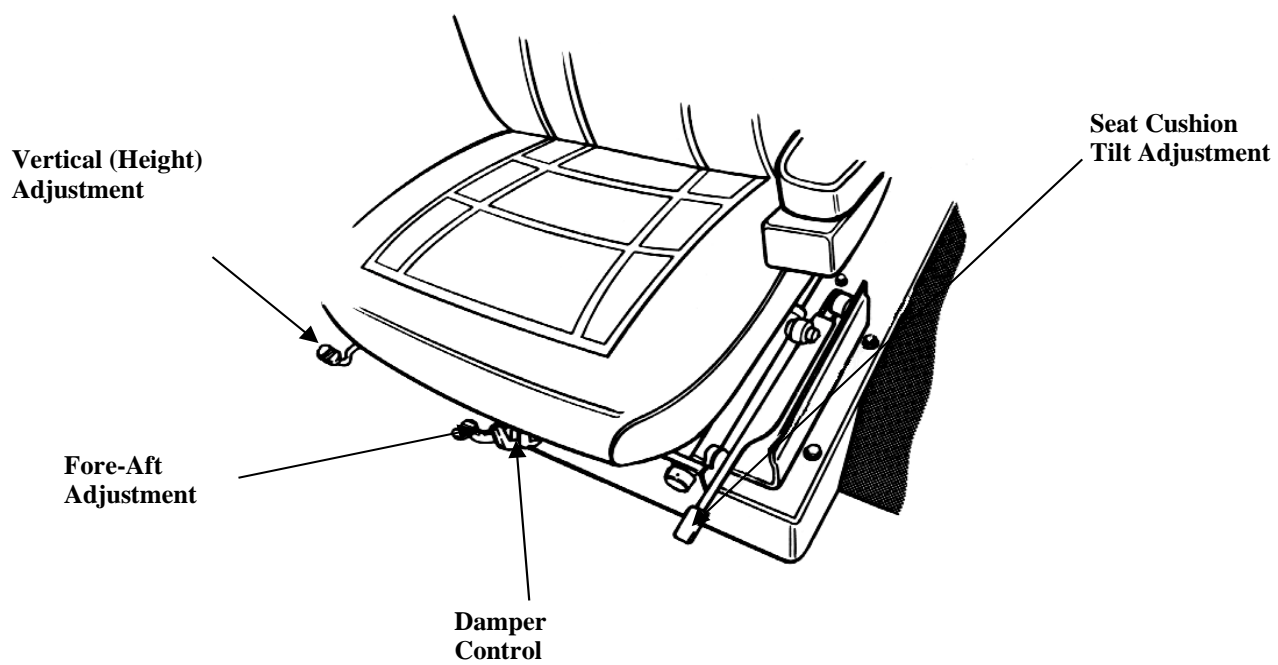
Fan Speed  
Control

Dome Light  
Switch

Floor  
Heater

Heat and Defrost  
Rotating Vents

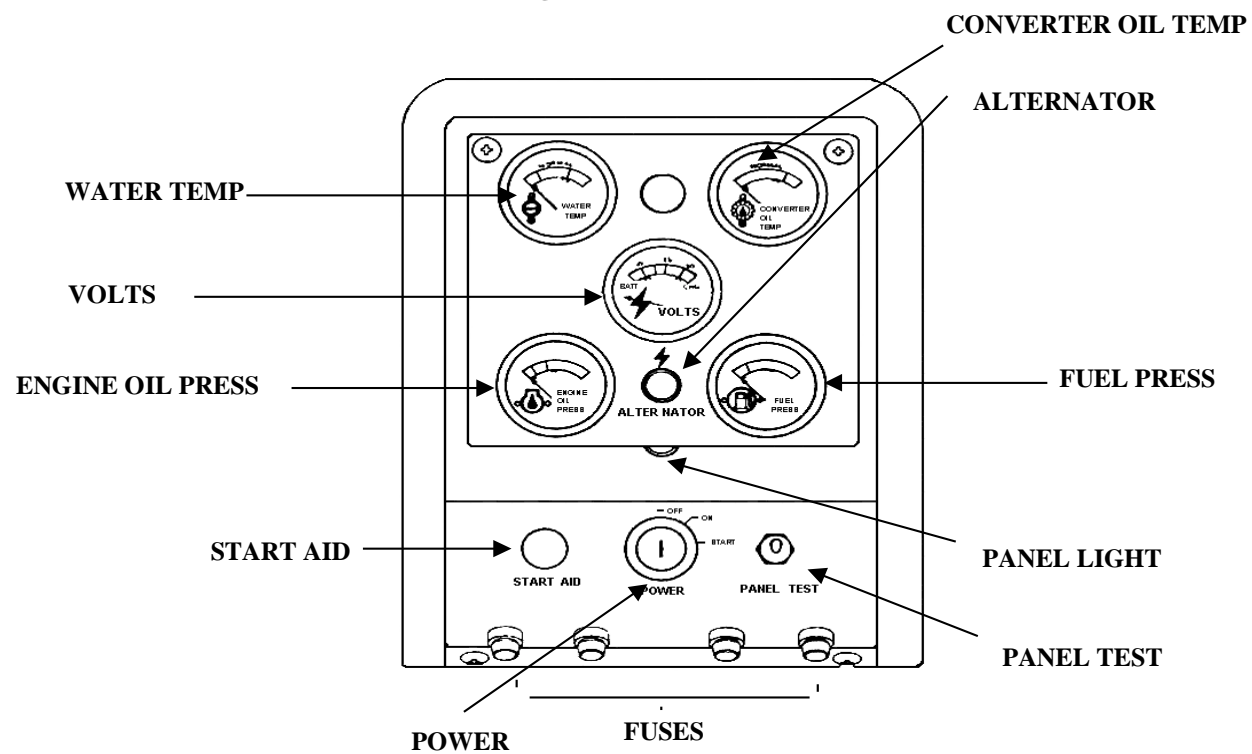
Transparency 4-51



Transparency 4-52



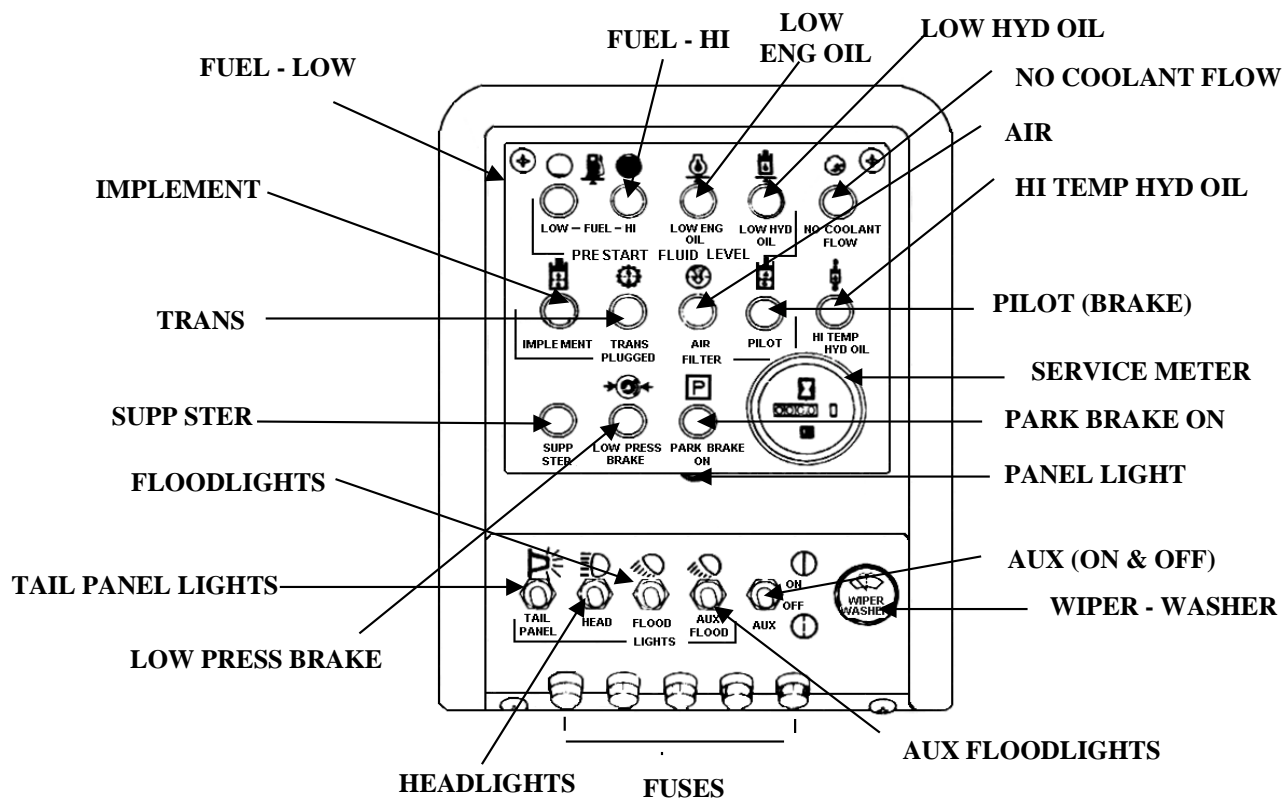
### Right Hand Instrument Panel



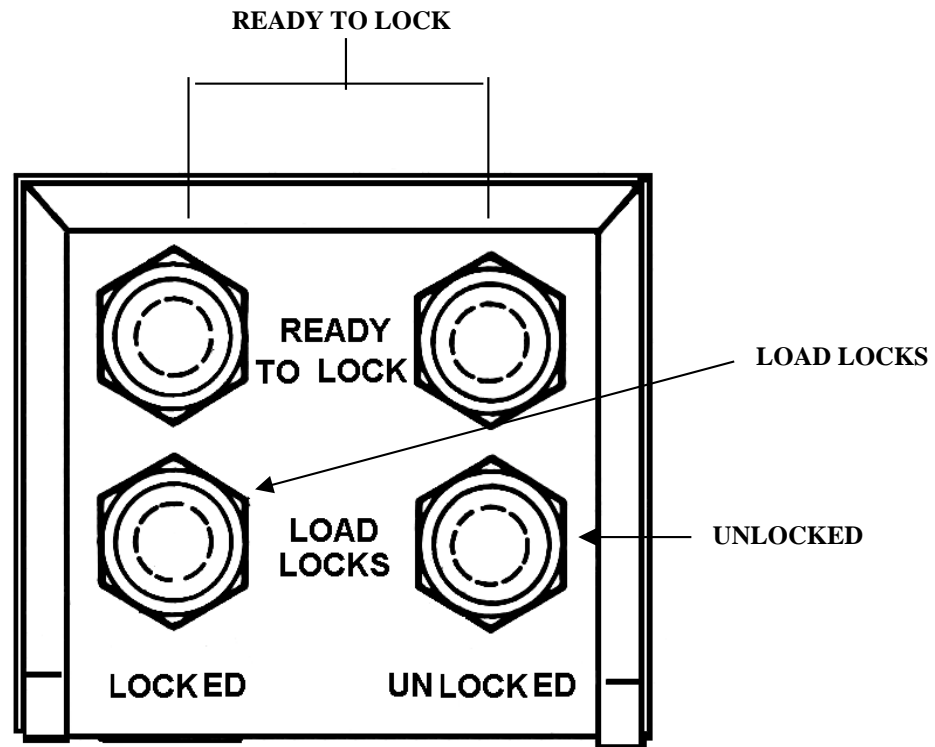
Transparency 4-53



### Left Hand Instrument Panel



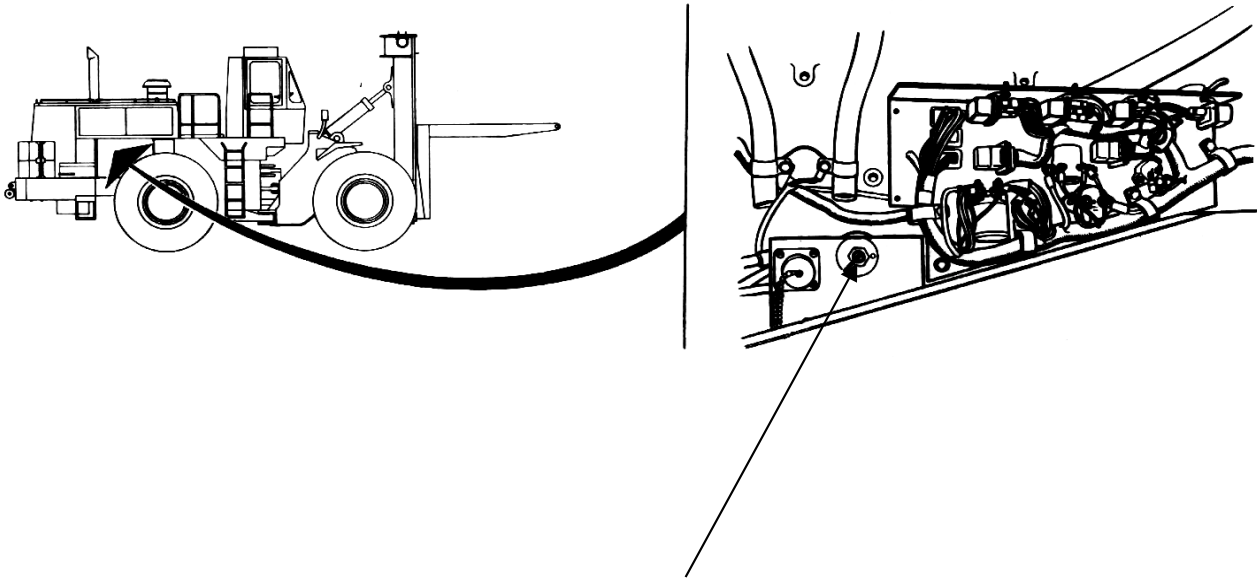
Transparency 4-54



CONTAINER LOCK INDICATOR PANEL

Transparency 4-55





MAIN DISCONNECT SWITCH

Transparency 4-56

## Summary

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**THE STUDENT SHOULD BE FAMILIAR WITH ALL THE COMPONENTS AND CAPABILITIES OF THE 50,000-POUND RTCH. THE STUDENT SHOULD ALSO BE ABLE TO PERFORM PMCS AND PREOPERATIONAL CHECKS.**

Transparency 4-57

## Objective

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**AFTER THE COMPLETION OF THIS LESSON, THE STUDENT WILL BE ABLE TO IDENTIFY SAFETY PRECAUTIONS AND OPERATIONS, WARNING AND CAUTION SIGNS, AND COMMUNICATE WITH HAND AND ARM SIGNALS.**

Transparency 4-58



# **SAFETY PRECAUTIONS AND OPERATIONS**

Transparency 4-59



**THIS VEHICLE IS NOT DESIGNED FOR AN ASSISTANT OPERATOR (SUCH AS RIDING THE CATWALK).**

- **STAY OUT OF PIVOT AREA WHEN THE VEHICLE IS TURNING.**
- **TRAVEL AT A SAFE SPEED (DO NOT FOLLOW TOO CLOSELY).**

Transparency 4-60



**NEVER COAST, ALWAYS CARRY LOAD  
CLOSE TO THE GROUND.**

Transparency 4-61



**THE HEIGHT OF THIS VEHICLE IS  
14 FT (4.3 M) FROM THE GROUND TO  
THE TOP OF THE MAST. STAY  
CLEAR OF ELECTRIC WIRES AND  
OVERHANGS.**

Transparency 4-62



**THE WEIGHT OF THIS VEHICLE IS  
113,000 LBS (51,000 KG) WITH 40-FT  
TOPHANDLER ATTACHED.  
ALWAYS STAY A SAFE DISTANCE  
FROM CLIFFS, DEEP EXCAVATIONS,  
OR OTHER DANGEROUS AREAS.**





**NEVER OPERATE THE RTCH ON  
A SIDE SLOPE THAT IS MORE  
THAN 15 DEGREES.**

Transparency 4-64



**NEVER OPERATE THE RTCH ON  
A DOWNHILL GRADE OF MORE  
THAN 15 PERCENT.**

Transparency 4-65



**ALWAYS STOP ENGINE AND  
LOWER MAST BEFORE LEAVING  
THE RTCH. MAST WILL LOWER  
WITH ENGINE OFF.**

Transparency 4-66



**ALWAYS KNOW THE SIZE  
OF THE AREA IN WHICH  
YOU HAVE TO OPERATE.**

Transparency 4-67



**DO NOT SMOKE WHEN  
REFUELING, OPERATING,  
OR PULLING MAINTENANCE  
ON THE RTCH.**

Transparency 4-68



**RELEASE RADIATOR CAP SLOWLY  
TO RELEASE PRESSURE. YOU COULD  
BE SCALDED BY STEAM OR INJURED  
BY A FLYING RADIATOR CAP.**



**MAKE SURE HYDRAULIC  
PRESSURE IS RELEASED  
BEFORE ANY MAINTENANCE  
IS PERFORMED ON THE  
HYDRAULIC SYSTEM.**

Transparency 4-70



**MAKE SURE THE SHIPPING LINK,  
LOCATED IN THE LOWER CENTER  
OF VEHICLE, IS DISCONNECTED  
BEFORE OPERATING VEHICLE.  
ALSO MAKE SURE SHIPPING LINK  
IS INSTALLED BEFORE SHIPMENT  
OR WHEN WORKING IN THE  
PIVOT AREA.**





**MAKE SURE ALL SAFETY GUARDS  
AND COVERS ARE IN PLACE.**

Transparency 4-72



**MAKE SURE THE ROPS IS NOT  
DAMAGED OR ALTERED. A  
STRUCTURALLY DAMAGED  
ROPS WILL NOT PROTECT YOU  
IN A ROLLOVER ACCIDENT.**



**NEVER WEAR LOOSE  
CLOTHING OR JEWELRY  
THAT COULD CATCH IN  
CONTROLS.**

Transparency 4-74



**WEAR HEARING PROTECTION  
WHEN OPERATING WITH  
WINDOWS OPEN. ALWAYS  
WEAR HEARING PROTECTION  
WHEN WITHIN 50 FT OF AN  
OPERATING RTCH.**

Transparency 4-75



**MAKE SURE ALL PERSONNEL  
STAY CLEAR OF WORK AREA  
WHEN OPERATING RTCH.**

Transparency 4-76



**BE FAMILIAR WITH ALL  
HAZARDS AND HAZARDOUS  
AREAS IN YOUR WORK  
SITE.**

Transparency 4-77



**PLACE RANGE SELECTOR  
IN NEUTRAL AND ENGAGE  
PARKING BRAKE BEFORE  
STOPPING ENGINE.**

Transparency 4-78



**ALWAYS TEST MAST  
CONTROLS FOR PROPER  
OPERATION BEFORE  
BEGINNING OPERATION.**

Transparency 4-79





**NEVER MOVE VEHICLE  
WITHOUT PROPER  
BRAKE OIL PRESSURE.**

Transparency 4-80



**ALWAYS WEAR YOUR  
SEAT BELT.**

Transparency 4-81



**KEEP VEHICLE CLEAN  
OF GREASE, FUELS,  
AND OILY RAGS.**

Transparency4-82



**WARNING: CARBON  
MONOXIDE (EXHAUST  
FUMES) CAN KILL YOU.**

Transparency 4-83



# **SAFETY PRECAUTIONS**

Transparency 4-84



- **Wear hard hats, ear plugs, safety boots, and work gloves at all times.**
- **Do not jump from on or off of machine.**
- **Never walk between the RTCH and container.**
- **Always operate vehicle with lights on.**
- **Always sound horn twice and look over both shoulders before shifting to reverse.**



- **Ground guides should always stand where the operator can see them at all times.**
- **Always keep a safe distance between vehicle (at least two vehicles apart).**
- **No horse playing or running in motor pool or training area.**
- **Never stand under forks or on tophandler (except during PMCS).**
- **Never stand behind the machine while engine is running.**

Transparency 4-86



# **WARNING AND CAUTION SIGNS**

Transparency 4-87





## CENTERED ABOVE DOOR ON LEFT HAND SIDE OF ROPS CANOPY



### WARNING:

TO AVOID POSSIBLE WEAKENING OF THIS ROPS, CONSULT A CATERPILLAR DEALER BEFORE ALTERING THIS ROPS IN ANY WAY. THE PROTECTION OFFERED BY THIS ROPS WILL BE IMPAIRED IF IT HAS BEEN SUBJECTED TO STRUCTURAL DAMAGE OR HAS BEEN INVOLVED IN AN OVERTURN INCIDENT.

THIS ROPS, WHEN PROPERLY INSTALLED ON A MACHINE WHICH IS NOT ALTERED TO EXCEED THE ROPS CERTIFICATION TEST WEIGHT MEETS, AT THE TIME OF INSTALLATION, CRITERIA ESTABLISHED BY:

OSHA REGULATIONS 29 CFR 1926.1001, 5 APRIL 72  
U.S. ARMY CORPS OF ENGINEERS EM 385-1-1, 1 JUNE 77  
SAE J231    SAE J394    SAE J1040b    ISO 3471    ISO 3449

### ROPS CERTIFICATION TEST WEIGHT:

MODEL NO.	POUNDS	KILOGRAMS
988B	113,000	51235

### CATERPILLAR TRACTOR CO.

GENERAL OFFICES  
PEORIA, ILLINOIS    3V7334    2

Transparency 4-88



# RIGHT HAND SIDE OF DASH



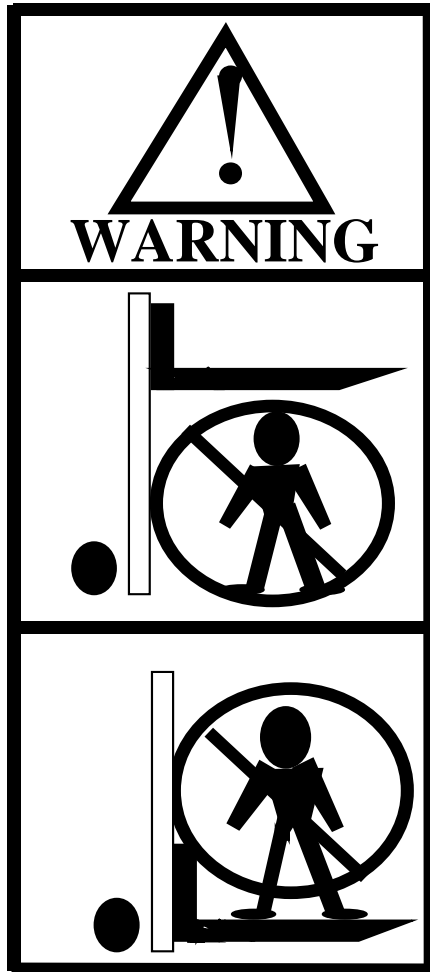
Transparency 4-89



## REAR CENTER OF MAST CROSS BAR



Transparency 4-90



**ON EACH SIDE  
TOP OF FORK  
ASSEMBLY**

Transparency 4-91



## AT FRAME ARTICULATION ON EACH SIDE OF VEHICLE



### WARNING

NO CLEARANCE FOR MAN IN THIS  
AREA WHEN TURNING VEHICLE

WHEN MACHINE IS TO BE LIFTED, TRANSPORTED ON ANOTHER VEHICLE OR SERVICE  
WORK IS BEING PERFORMED NEAR CENTER OF MACHINE CONNECT SAFETY ROD BETWEEN  
FRONT AND REAR FRAMES TO KEEP MACHINE IN STRAIGHT AHEAD POSITION

BEFORE OPERATION AND WHEN OPERATING BE SURE SAFETY ROD LOCATED NEAR LOWER CENTER  
OF MACHINE IS DISCONNECTED AND PINNED TO RETAINING PLATES

Transparency 4-92



# HAND AND ARM SIGNALS

Transparency 4-93



**Use the following signal to indicate STOP or DISREGARD  
LAST COMMAND**



**Raise right arm above head  
with forearm bent at elbow  
with fist clenched.**

Transparency 4-94



Use the following signal to indicate  
**SLOW DOWN**



Lower right arm to waist level and wave arm in a sweeping motion from right to left, and turn several times.

Transparency 4-95





**Use the following signal to indicate LOWER LOAD**



**With right arm bent at the elbow and forearm lowered, point forefinger downward.**

Transparency 4-96



**Use the following signal to indicate LIFT LOAD**



**Raise the right arm above the head with arm bent at elbow and with forefinger pointing upward.**

Transparency 4-97



**Use the following signal to indicate TILT LOAD FORWARD**



**With right arm bent at the elbow and forearm lowered, point middle fingers downward.**

Transparency 4-98



**Use the following signal to indicate TILT LOAD BACK**



**Raise the right arm  
above the head with  
arm bent at elbow and  
with forefinger and  
middle finger pointing  
upward.**

Transparency 4-99



**Use the following signal to indicate TILT LOAD TO THE SIDE**



**Place hands on hips  
and tilt (oscillate) the  
body in the direction  
the load should be  
tilted.**

Transparency 4-100



**Use the following signal to indicate SIDE SHIFT THE LOAD**



**Bend both arms at the elbows and extend the arms forward at waist level. Then extend either the left or right hand with fingers extended and joined and point with forefinger of the other hand toward the open palms in the direction in which the load is to be shifted.**

Transparency 4-101